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ALFRED J MANGELS 4729 CORNELL ROAD CINCINNATI, OH 452412433			EXAMINER RALJS, STEPHEN J	
			ART UNIT 3742	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/510,145

**Applicant(s)**

SUNDBERG ET AL.

**Examiner**

STEPHEN J. RALIS

**Art Unit**

3742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 August 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,5,6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,6 and 8-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Applicant is respectfully requested to provide a location within the disclosure to support any further amendments to the claims due to when filing an amendment an applicant should show support in the original disclosure for new or amended claims. See MPEP § 714.02 and § 2163.06 ("Applicant should specifically point out the support for any amendments made to the disclosure.").

***Response to Amendment/Arguments***

3. Applicant's arguments filed 05 August 2010 have been fully considered but they are not persuasive as set forth below.

***Information Disclosure Statement***

4. The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other

information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper." Therefore, the references cited in the Search Report have not been considered. Applicant is advised that the date of submission of any item of information or any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

5. NOTE: If applicant desires the "Search Report" to be considered, it respectfully recommended that applicant place such prior art officially on the record with a filing of an information disclosure statement (IDS), as set forth above.

### ***Claim Objections***

6. Claim 6 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1, 5, 6 and 8-12 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant application, claim 1 recites the limitation "wherein the  $\text{SiO}_2$  present in the heating element material mixture does not affect molybdenum silicide crystal lattice symmetry". The original written description clearly discloses the heating element material mixture that does not affect molybdenum silicide crystal lattice symmetry as being silicates such as mullite and sillimanite (paragraph 21). In order for applicant to recite the properties of the material, the material must be present. Therefore, the removal of "is a silicate that" from the claim 1 is deemed new matter since the properties are associated with the material of the heating element, in this case silicates.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1, 5, 6 and 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the instant application, claim 1 recites the limitation "wherein the  $\text{SiO}_2$  present in the heating element material mixture does not affect molybdenum silicide crystal lattice symmetry". The original written description and previously recited claim 1, clearly disclose and recite the heating element material

mixture that does not affect molybdenum silicide crystal lattice symmetry as being silicates such as mullite and sillimanite (paragraph 21), In order for applicant to recite the properties of the material, the material must be present. Therefore, the removal of "is a silicate that" from the claim 1 is deemed to make the claim indefinite since the properties are associated with the material of the heating element, in this case silicates are required.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 1, 4-6, 8-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schrewelius (U.S. Patent No. 2,955,145) in view of Schrewelius (U.S. Patent No. 2,992,959) and in further view of Sekhar et al. (U.S. Patent No. 5,420,399) and Chyung et al. (U.S. Patent No. 3,725,091).

Schrewelius'145 discloses a powdered molybdenum-silicide based heating element and method of producing (column 2, lines 3-54) containing essentially of molybdenum silicide (column 1, lines 59-72; column 2, lines 1-2, 31-35) and alloys of that material, said method comprising the steps of: providing powdered molybdenum aluminosilicide material (column 1, lines 59-72; column 2, lines 1-2, 31-35); mixing the powdered molybdenum aluminosilicide with  $\text{SiO}_2$  to provide a heating element material mixture (column 2, lines 14-20; column 2, lines 31-36; NOTE: when  $y=0$ ; column 1, lines 71-72), and forming a heating element from the heating element material mixture (column 2, lines 14-70). While Schrewelius'145 is silent to the production of  $\text{Al}_2\text{O}_3$  in addition to the  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$ , the examiner notes that  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$ , when combined with  $\text{SiO}_2$  and sintered, produces an  $\text{Al}_2\text{O}_3$  product as will be shown by Schrewelius'959.

With respect to the further limitations of claims 1, 4-6, 8 and 9, Schrewelius'145 further discloses wherein  $x$  lies in the range of 0.45 - 0.55 (i.e. 0.2 – 0.6; column 1, line 69; column 4, claims 1, 3); including the step of partially substituting Re or W in the material  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$  for molybdenum (i.e. W or tungsten; column 1, lines 59-72; column 2, lines 1-2; column 4, claims 1, 3).

Schrewelius'145 discloses a molybdenum-silicide heating element and method of producing except for specifically calling for the product being formed by the method also consisting essentially of (i.e. comprising)  $\text{Al}_2\text{O}_3$ ; and the  $\text{SiO}_2$  being at least 98% pure, the  $\text{SiO}_2$  present in the heating element material mixture being a silicate, mullite, that does not affect molybdenum silicide crystal lattice symmetry and wherein other components of the included silicate have properties that prevent alloying of the other components of the included silicate with molybdenum silicide, and the heating element material being free of bentonite and excluding impurities that contain Mg, Ca, Fe, Na, and K; and the oxide layer not peeling under thermal cycling at about 1500°C, whereby heating oven contamination in the form of peeled heating element oxide layer particles in a heating oven containing the heating element *is prevented*.

However, sintering the formed element with the heating element including on its surface an oxide layer consisting of essentially of  $\text{Al}_2\text{O}_3$  is known in the art. Schrewelius'959, for example, teaches a method of producing a molybdenum-silicide-type heating element in which a  $\text{Al}_2\text{O}_3$  product is formed via the chemical reaction to form a ceramic glass component that efficiently stops the grain growth of the silicide at high temperatures (column 5, lines 69-75; column 6, lines 1-7); and the oxide layer not



peeling under thermal cycling at about 1500°C (material of type III can withstand a temperature of 1650°C for more than 1000 hours;; column 5, lines 11-17; a material able to withstand an operating temperature of 1650°C does not deteriorate or peel over time; column 7, lines 45-50), protecting against further oxidation (column 8, claim 2), thereby increasing the operational life of said heating element.

NOTE: With respect to the limitation of "the heating element *substantially contains*  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$  and  $\text{Al}_2\text{O}_3$ ...", the heating element includes on its surface an oxide layer *consisting of essentially of*  $\text{Al}_2\text{O}_3$ ..., the term "substantially" is often used in conjunction with another term to describe a particular characteristic of the claimed invention. It is a broad term. (See MPEP 2173.05). In addition, the term "consisting essentially of" claim occupies a middle ground between closed claims that are written in a consisting of' format and fully open claims that are drafted in a comprising' format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." (See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355) (see MPEP 2111.03). In the instant case, applicant discloses "the present invention thus relates to a method of producing a heating element substantially of the molybdenum silicide type and alloys of this basic material, and is characterized by producing a material that *substantially contains*  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$  and  $\text{Al}_2\text{O}_3$  by mixing a molybdenum aluminosilicide with  $\text{SiO}_2$  wherein  $\text{SiO}_2$  has a purity of at least 98% (see paragraph 17).

Therefore, the terminology "substantially contains" is an open end disclosure to the composition of the heating element, therefore, the claims are interpreted and disclosed by the specification with "consisting essentially of" as being equivalent to "comprising."

Similarly, providing a heating material mixture with  $\text{SiO}_2$  being at least 98% pure and such a mixture being free of bentonite and excluding impurities that contain Mg, Ca, Fe, Na, and K is known in the art. Sekhar et al., for example, teach a method of producing a heating element mixture utilizing pure  $\text{SiO}_2$  to reduce the impurities in the resulting heating element, increasing the working temperature of the heating element (column 16, lines 12-20), thereby producing a more efficient heating element. Sekhar further teaches the working temperature of the heating elements was increased in comparison to products using bentonite as a plasticizer, due to reduction of the impurity phase (column 16, lines 21-29). Since Sekhar et al. teach the replacement of bentonite with the pure  $\text{SiO}_2$ , the replacement would mean that no bentonite exists, therefore, the resulting heating element structure would exclude impurities that contain Mg, Ca, Fe, Na, and K, since they are associated with bentonite.

In addition, a  $\text{SiO}_2$  being present in the mixture being a silicate that does not affect symmetry of molybdenum silicide crystal lattice, wherein other components of the included silicate have properties that prevent alloying of the other components of the included silicate with molybdenum silicide, and the silicate being mullite is known in the art. Chyung et al., for example, a method for producing a heating element (refractory electrode; column 1, lines 9-14; column 2, lines 10-16 ) wherein the  $\text{SiO}_2$  is present in the mixture (column 3, lines 12-17 ) is a silicate mullite (i.e. mullite;  $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$

inherently has  $\text{SiO}_2$ ; is used; i.e. high temperature applications; column 5, lines 48-52) and does not affect symmetry of molybdenum silicide crystal lattice (column 2, lines 65-68; column 3, lines 1-7, lines 57-64; column 10-11, claim 9) to provide an improved cermet material of high density, low porosity, good thermal conductivity, low electrical resistivity and good strength which is compatible with both metals and ceramics in terms of thermal expansion and bonding capability, thereby producing a more efficient heating element.

NOTE: Applicant has disclosed that mullite and sillimanite are conceivable materials that have properties that prevent molybdenum silicide from being alloyed with other substances concerned and with which the symmetry of the crystal lattice of the molybdenum will be retained. (paragraph 21) In addition, both mullite and sillimanite have the same crystal system (i.e. orthorhombic) . Therefore, where the prior art teaches the same chemical composition, the properties of instant claims are necessarily present.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the molybdenum-silicide-type heating element and method of producing of Schrewelius'145 with the teaching of the production of  $\text{Al}_2\text{O}_3$  in addition to the  $\text{Mo}(\text{Si}_{1-x}\text{Al}_x)_2$  of Schrewelius'959 to form a ceramic glass component that efficiently stops the grain growth of the silicide at high temperatures, protecting against further oxidation (column 8, claim 2), thereby increasing the operational life of said heating element. Similarly, it would have further been obvious to one of ordinary skill in the art at the time of the invention was made to modify the Schrewelius'145-

Schrewelius'959 molybdenum-silicide-type heating element and method of producing combination with the teaching of replacing bentonite with pure  $\text{SiO}_2$  of Sekhar et al. to reduce the impurities in the resulting heating element, increasing the working temperature of the heating element, thereby producing a more efficient heating element thereof. In addition, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the Schrewelius'145-Schrewelius'959-Sekhar molybdenum-silicide heating element and method of producing combination with the mixture and teaching of the use thereof of Chyung et al. to provide an improved cermet material of high density, low porosity, good thermal conductivity, low electrical resistivity and good strength which is compatible with both metals and ceramics in terms of thermal expansion and bonding capability, thereby producing a more efficient heating element.

With respect to the limitation of the oxide layer not peeling from the surface of the heating element between room temperature and about  $1500^\circ\text{C}$  whereby heating oven contamination in the form of peeled heating element oxide layer particles in a heating oven containing the heating element is prevented, Schrewelius'145 discloses the use of the alloys according to the invention in a temperature of  $1600$  to  $1700^\circ\text{C}$  (column 2, lines 28-30). Schrewelius'959 teaches a material of type III comprising  $\text{Al}_2\text{O}_3$  that can withstand a temperature of  $1650^\circ\text{C}$  for more than 1000 hours (column 5, lines 11-17; column 6, lines 3-11) and a material able to withstand an operating temperature of  $1650^\circ\text{C}$  does not deteriorate or peel over time (column 7, lines 45-50). Sekhar teaches electrical heating element compositions and the comparison between using pure  $\text{SiO}_2$

instead of bentonite (column 16, lines 11-29) to reduce the impurities in the resulting heating element, increasing the working temperature of the heating element. Sekhar further teaches the heating elements being tested at temperatures between 1200 °C and 1600 °C without any sign of deterioration (column 14, lines 28-40) with deterioration inherently including physical wear/break down of the composition of the heating element which would include peeling. Therefore since Schrewelius'145 discloses the use of the heating element device at device at 1600 to 1700°C, Schrewelius'959 teaches a material of type III comprising  $\text{Al}_2\text{O}_3$  that can withstand a temperature of 1650°C for more than 1000 hours, and Sekhar teaches the replacement of a bentonite plasticizer with a pure  $\text{SiO}_2$  plasticizer to remove impurities and prevent any sign of deterioration of the heating element at high operating temperatures, Schrewelius'145 in view of Schrewelius'959 and Sekhar fully meets "which oxide layer does not peel from the surface of the heating element under thermal cycling of the heating element between room temperature and about 1500°C, whereby heating oven contamination in the form of peeled heating element oxide layer particles in a heating oven containing the heating element is prevented" given its broadest reasonable interpretation.

Furthermore, although Schrewelius'145 in view of Schrewelius'959, Sekhar and Chyung disclose the improved structure and method of making, the reasons for combining are not exactly the same as applicants. However, if a composition is physically the same, it must have the same properties. A chemical composition and its properties are inseparable. Therefore, where the prior art teaches the same chemical composition, the properties of instant claims are necessarily present.

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schrewelius (U.S. Patent No. 2,955,145) in view of Schrewelius (U.S. Patent No. 2,992,959), Sekhar et al. (U.S. Patent No. 5,420,399) and Chyung et al. (U.S. Patent No. 3,725,091) as applied to claims 1, 4-6 and 8-10 above, and further in view of Sawamura et al. (U.S. Patent No. 5,756,215).

The Schrewelius'145-Schrewelius'959-Sekhar-Chyung molybdenum-silicide heating element and method of producing combination discloses all of the limitations, as previously set forth, except for the silicate being sillimanite instead of mullite.

However, Sawamura teaches that sillimanite is an equivalent structure known in the art (metal oxide comprising at least one of mullite or sillimanite; column 12, lines 40-45). Therefore because these two silicates were art-recognized equivalents at the time of the invention was made, one of ordinary skill in the art would have found it obvious to substitute sillimanite for mullite.

#### ***Remarks***

16. With respect to applicants' reply/argument that Schrewelius'145 is directed to a thermocouple alloy, not to an electrical heating element, the examiner respectfully disagrees. Although Schrewelius'145 does disclose the thermo-electric alloys being used for thermocouples, Schrewelius'145 further discloses the alloy of the invention "may also advantageously be used as heating resistors for producing high

temperatures" (column 2, lines 14-17). Therefore, Schrewelius'145 fully meets "forming a heating element..." given its broadest reasonable interpretation.

17. With respect to applicant's argument that Schrewelius'145 teaches away from using pure  $\text{SiO}_2$ , the examiner respectfully disagrees. Schrewelius'145 discloses a ceramic binding substance, predominantly being  $\text{SiO}_2$  (column 2, lines 31-40) with bentonite being used as the binding substance (column 2, line 71 - column 3, line 15). There is no disclosure or teaching to the ceramic binding substance not potentially being pure  $\text{SiO}_2$  or such a substitution causing detrimental effects to the heating element composition, only to it being preferred to be predominantly  $\text{SiO}_2$  with two parts bentonite. Furthermore, the reference to Sekhar et al. is cited for a teaching, suggestion and motivation for using pure  $\text{SiO}_2$ .

18. With respect to applicant's reply/argument that "the examiner specifically admitted that the Schrewelius '145 reference does not disclose: ...the product being formed by the method also consisting essentially of (i.e. comprising)  $\text{Al}_2\text{O}_3$ ; and the  $\text{SiO}_2$  being at least 98% pure and the heating element being free of bentonite; and the oxide layer not peeling under thermal cycling at about  $1500^\circ\text{C}$ , whereby heating oven contamination in the form of peeled heating element oxide layer particles in a heating oven containing the heating element is prevented. (emphasis in original) With that explicit concession of the several claim limitations that are not disclosed in the Schrewelius '145 reference, that reference clearly cannot be said to anticipate any of the claims of the present application", the examiner respectfully disagrees.

The examiner has provided applicant a 35 U.S.C. 103(a) rejection for all claims. In no way shape or form are separate rejections an admission by the examiner that the claims are not anticipated or obvious thereover Schrewelius'145, only an admission to separate teachings in light of the prior art of record. An argument to the fact that one teaching negates or overcomes a previous teaching is not deemed persuasive due to no evidenced being provided by applicant to such an argument. Therefore, the rejection of claims are maintained as set forth above.

19. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

20. With respect to applicant's argument that Schrewelius'145 teaches away from using pure SiO<sub>2</sub>, the examiner respectfully disagrees. Schrewelius'145 discloses a ceramic binding substance, predominantly being SiO<sub>2</sub> (column 2, lines 31-40) with bentonite being used as the binding substance (column 2, line 71 - column 3, line 15). There is no disclosure or teaching to the ceramic binding substance not potentially being pure SiO<sub>2</sub> or such a substitution causing detrimental effects to the heating element composition, only to it being preferred to be predominantly SiO<sub>2</sub> or bentonite. Furthermore, the reference to Sekhar et al. is cited for a teaching, suggestion and motivation for using pure SiO<sub>2</sub>.



Sekhar et al. teach a method of producing a heating element utilizing pure  $\text{SiO}_2$  to reduce the impurities in the resulting heating element, increasing the working temperature of the heating element (column 16, lines 12-20), thereby producing a more efficient heating element. Sekhar further teaches the working temperature of the heating elements was increased in comparison to products using bentonite as a plasticizer, due to reduction of the impurity phase (column 16, lines 21-29). Therefore, the examiner maintains that Sekhar teaches the replacement of bentonite with pure  $\text{SiO}_2$  as a plasticizer/additive and motivation, teaching and suggestion to do so.

21. With respect to applicants reply/argument that none of the references relied upon discloses or suggests an  $\text{Al}_2\text{O}_3$  outer surface layer, nor do any of the references even mention or appreciate the problem to which the present invention is directed - the peeling of a surface layer of  $\text{Al}_2\text{O}_3$  upon subjection to thermal cycling of a heating element having such a surface layer", the examiner respectfully disagrees. While Schrewelius'959 does disclose the layer being a quartz glass or  $\text{SiO}_2$  layer, Schrewelius'959 also disclose that during the final sintering process/operation, silica or mixed oxides are formed which fill up the remaining pores and form a surface film of  $\text{SiO}_2$  (column 2, lines 28-32; column 4, lines 34-38). Schrewelius'959 further disclose the ceramic glass component being a product of  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  (see composition III; column 5, lines 11-25; column 6, lines 3-7), and with the previous mentioned disclosure, would inherently provide particles of  $\text{Al}_2\text{O}_3$  to fill the pores of  $\text{SiO}_2$ . Furthermore, Schrewelius'959 discloses that a material of type III can withstand a temperature of  $1650^\circ\text{C}$  for more than 1000 hours (material III: column 5, lines 11-17) and a material

able to withstand an operating temperature of 1650°C inherently does not deteriorate or peel over time (column 7, lines 45-50) or the structure would not be operating as disclosed. Furthermore, Sekhar teaches electrical heating element compositions and the comparison between using pure SiO<sub>2</sub> instead of bentonite (column 16, lines 11-29) to reduce the impurities in the resulting heating element, increasing the working temperature of the heating element. Sekhar further teaches the heating elements being tested at temperatures between 1200 °C and 1600 °C without any sign of deterioration (column 14, lines 28-40) with deterioration inherently including physical wear/break down of the composition of the heating element which would include peeling. Therefore since Schrewelius'145 discloses the use of the heating element device at device at 1600 to 1700°C, Schrewelius'959 teaches a material of type III comprising Al<sub>2</sub>O<sub>3</sub> that can withstand a temperature of 1650°C for more than 1000 hours, and Sekhar teaches the replacement of a bentonite plasticizer with a pure SiO<sub>2</sub> plasticizer to remove impurities and prevent any sign of deterioration of the heating element at high operating temperatures, Schrewelius'145 in view of Schrewelius'959, Sekhar and Chyung et al. fully meets "which oxide layer does not peel from the surface of the heating element under thermal cycling of the heating element between room temperature and about 1500°C, whereby heating oven contamination in the form of peeled heating element oxide layer particles in a heating oven containing the heating element is prevented" given its broadest reasonable interpretation.

Furthermore, although Schrewelius'145 in view of Schrewelius'959, Sekhar and Chyung et al. disclose the improved structure and method of making, the reasons for

combining are not exactly the same as applicants. However, if a composition is physically the same, it must have the same properties. A chemical composition and its properties are inseparable. Therefore, where the prior art teaches the same chemical composition, the properties of instant claims are necessarily present.

22. With respect to applicant's reply/argument that Sekhar et al.'399 teach away from the sintering step, the examiner respectfully disagrees. While Sekhar et al. teach a preferred embodiment of micropyrritic synthesis (column 1, lines 47-52), disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments. Furthermore, the examiner can find no teaching to criticize, discredit or otherwise discourage trying sintering (see MPEP § 2123). Furthermore, Sekhar et al. teach heating the mixture to form a slurry, fashioning the slurry into a shape and combusting the shape. Such a disclosure is deemed to be sintering given its broadest reasonable interpretation. Therefore, the examiner asserts that Sekhar et al. do not teach away from using sintering given its broadest reasonable interpretation.

23. With respect to applicant's reply/argument that Chyung et al. does not specifically disclose the  $\text{SiO}_2$  present in the heating element material mixture being a silicate, mullite, that does not affect molybdenum silicide crystal lattice symmetry, the claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable (see MPEP § 2112). Applicant has disclosed that mullite and sillimanite are conceivable materials that have properties that prevent molybdenum silicide from being alloyed with other substances concerned and

with which the symmetry of the crystal lattice of the molybdenum will be retained. (paragraph 21) In addition, both mullite and sillimanite have the same crystal system (i.e. orthorhombic) . If a composition is physically the same, it must have the same properties. A chemical composition and its properties are inseparable. Hence, where the prior art teaches the same chemical composition, the properties of instant claims are necessarily present. Therefore, the mullite of Chyung et al. fully meets "the SiO<sub>2</sub> present in the heating element material mixture being a silicate, mullite, that does not affect molybdenum silicide crystal lattice symmetry" given its broadest reasonable interpretation.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, all the references teach a teaching, suggestion and motivation to combine. Schrewelius'959 teaches, suggests and motivates one of ordinary skill in the art to form a ceramic glass component comprising Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub> that efficiently stops the grain growth of the silicide at high temperatures, protecting against further oxidation (column 8, claim 2), thereby increasing the operational life of said heating element. In addition, Sekhar et al. teaches, suggests and motivates one of ordinary skill in the art to reduce the impurities

in the resulting heating element by using pure SiO<sub>2</sub> instead of bentonite to increase the working temperature of the heating element, thereby producing a more efficient heating element. Similarly, Chyung et al. teach utilizing a silicate mullite to provide an improved cermet material of high density, low porosity, good thermal conductivity, low electrical resistivity and good strength which is compatible with both metals and ceramics in terms of thermal expansion and bonding capability, thereby producing a more efficient heating element. Therefore, the examiner maintains the 35 U.S.C. 103(a) as asserted above.

24. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

25. Applicant has cited several court cases. One of them, KSR, in fact, supports the examiner's position, not applicant's, as set forth by the Court. With respect to the others the fact scenarios are different and are, therefore, not applicable.

26. The Declaration under 37 CFR 1.132 filed 02 March 2009 is insufficient to overcome the rejection of claims 1, 2, 4-6 and 8-11 based upon 35 U.S.C. 103(a) as set forth in the last Office action because: In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh

the evidence of obviousness. The Declaration provides evidence to the invention (i.e. usage of 98% pure  $\text{SiO}_2$  instead of bentonite). However, the evidence further provides support for the examiner's position that if a composition is physically the same, it must have the same properties. A chemical composition and its properties are inseparable. Therefore, where the prior art teaches the same chemical composition, the properties of instant claims are necessarily present.

***Conclusion***

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **STEPHEN J. RALIS** whose telephone number is (571)272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen J Ralis/  
Primary Examiner, Art Unit 3742

Stephen J Ralis  
Primary Examiner  
Art Unit 3742

SJR  
October 22, 2010